WHAT IS CLAIMED IS:

1. An electron beam lithography apparatus including an electron optical lens-barrel having an electron lens for converging an electron beam and a deflector for deflecting the electron beam, a sample chamber for holding a sample to be subjected to lithography in a vacuum state, and a sample stage on which the sample is placed, comprising:

a magnetic constraint structure for constraining a posture of the sample stage using a magnetic force;

a first leakage magnetic field shield for shielding a leakage magnetic field from said magnetic constraint structure to an internal space in the sample chamber; and

a second leakage magnetic field shield for shielding a leakage magnetic field from the electron optical lens-barrel to the internal space in the sample chamber.

2. The apparatus according to claim 1, wherein said magnetic constraint structure constrains the posture of the sample stage using a magnetic force generated by a permanent magnet.

3. An electron beam lithography apparatus including an electron optical lens-barrel having an electron lens for converging an electron beam and a deflector for deflecting the electron beam, a sample chamber for

holding a sample to be subjected to lithography in a vacuum state, and a sample stage on which the sample is placed, comprising:

an electromagnetic driver for electromagnetically driving the sample stage; and

a first leakage magnetic field shield for shielding a leakage magnetic field from said electromagnetic driver to an internal space in the sample chamber.

4. The apparatus according to claim 3, further comprising a second leakage magnetic field shield for shielding a leakage magnetic field from the electron optical lens-barrel to the internal space in the sample chamber.

5. The apparatus according to claim 3, wherein

said first leakage magnetic field shield comprises a fixed magnetic field shield member;

said electromagnetic driver comprises

a plurality of permanent magnets fixed inside said magnetic field shield member while being aligned in a driving direction of the sample stage, and

a movable driving coil opposing said permanent magnets; and

the sample stage is coupled to said driving coil and driven by energizing said driving coil to drive said driving coil.

6. The apparatus according to claim 3, wherein said first leakage magnetic field shield comprises a movable magnetic field shield member;

said electromagnetic driver comprises a permanent magnet fixed to said magnetic field shield member, and

a plurality of driving coils fixed while opposing said permanent magnet and aligned in a driving direction of the sample stage; and

the sample stage is coupled to said magnetic field shield member and permanent magnet and driven by energizing, of said plurality of driving coils, driving coils located inside said magnetic field shield member to drive said permanent magnet and said magnetic field shield member.

7. A stage used in an electron beam lithography apparatus, comprising:

a sample stage on which a sample is placed;

a magnetic force generator for applying a pre-load to said sample stage; and

a leakage magnetic field shield for shielding a leakage magnetic field from said magnetic force generator.

8. The stage according to claim 7, wherein said sample stage is supported to float on a surface plate by air.

9. The stage according to claim 7, wherein said leakage magnetic field shield is provided outside said magnetic force generator.

10. The stage according to claim 7, wherein letting t1 be a distance between said magnetic force generator and the surface plate, and t2 be a distance between said leakage magnetic field shield and the surface plate, a relationship t1 > t2 is satisfied.

11. An electron beam lithography method using an electron beam lithography apparatus comprising an electron optical lens-barrel having an electron lens for converging an electron beam and a deflector for deflecting the electron beam, a surface plate, a sample stage movable on the surface plate, a magnetic force generator for applying a pre-load to the sample stage, and a leakage magnetic field shield for shielding a leakage magnetic field from the magnetic force generator, comprising the steps of:

placing a sample on the sample stage; and

directly drawing a pattern on the sample using the electron beam.